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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,893	07/20/2004	Kazuo Yokoyama	2004-1148A	9009
513	7590	01/25/2006	EXAMINER	
WENDEROTH, LIND & PONACK, L.L.P.			DOAN, JENNIFER	
2033 K STREET N. W.				
SUITE 800			ART UNIT	
WASHINGTON, DC 20006-1021			PAPER NUMBER	
			2874	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/501,893	YOKOYAMA ET AL.	
	Examiner	Art Unit	
	Jennifer Doan	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30 is/are allowed.
- 6) ☒ Claim(s) 19, 20, 23-25, 28, 31-36, 38 and 40 is/are rejected.
- 7) ☒ Claim(s) 21, 22, 26, 27, 29, 37 and 39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>072004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The prior art documents submitted by applicant in the Information Disclosure Statement filed on 07/20/04, have all been considered and made of record (note the attached copy of form PTO-1449).

Drawings

3. The drawings, filed on 07/20/04, are accepted.

Specification

4. Applicants' cooperation is requested in correcting any errors of which applicants may become aware in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent

granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 19, 20, 23-25, 28, 31-36, 38 and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Hwang (U.S. 2004/0061417 A1).

With respect to claims 19 and 33, Hwang (figures 3 and 5) discloses an optical switch comprising a mirror device (90) for reflecting light from an optical transmission path on incident side and actuators (60, 260) for actuating the mirror device (90), the mirror device (90) adapted for switching an optical path of the light incident from the optical transmission path on incident side into an optical transmission path on outgoing side by the actuation performed by the actuator, the actuators (60, 260) configured by piezoelectric elements (65, 265) comprising piezoelectric thin films, electrodes for applying voltage for actuating the piezoelectric thin films, and elastic members having the piezoelectric thin films and the electrodes, the optical switch, wherein longitudinal directions of the piezoelectric elements confronting across the mirror device are parallel and wherein the mirror device is actuated by flexure deformation of the piezoelectric thin films which is caused by application of voltage to the electrodes (see paragraphs [0030], [0040] and [0043]).

With respect to claims 20 and 34, Hwang discloses the optical switch, wherein a mirror surface is provided on the mirror device in a plane that is parallel to the piezoelectric thin films, wherein the mirror device is inclined by the actuators relative to

the plane parallel to the piezoelectric thin films, and wherein a plurality of the optical transmission paths arranged in a plane generally normal to the thin films are thus switched by control of an angle of reflection of the mirror surface (see paragraph [0040]).

With respect to claim 23, Hwang discloses the optical switch, wherein the actuators are composed of a plurality of piezoelectric elements, wherein each of the piezoelectric elements is partitioned into a plurality of electrodes, and wherein application of different voltages to the electrodes causes the piezoelectric thin films to undergo flexure deformation with different curvatures (see paragraph [0008]).

With respect to claim 24, Hwang discloses the optical switch, wherein the elastic members constituting the piezoelectric elements at least include silicon thin films or silicon oxide films that have constituted a Silicon-on-Insulator substrate (see paragraph [0057]).

With respect to claims 25 and 35, Hwang discloses the optical switch, wherein mirror surfaces are provided on the mirror device so as to extend in a direction of a normal to the piezoelectric thin films and wherein the actuators actuate the mirror device in the direction of the normal to the piezoelectric thin films, and wherein the mirror device is inserted into a plurality of the optical transmission paths arranged in a plane in parallel with the thin films, and switch the transmission paths (see paragraph [0040]).

With respect to claims 28 and 38, Hwang (figure 3) discloses the optical switch, wherein the actuators comprise a mirror device holding device for holding the mirror device in a specified position after inclinatory or translational movement of the mirror device (see paragraph [0049]).

With respect to claims 31 and 32, Hwang (figures 3 and 5) discloses a method of manufacturing an optical switch comprising a mirror device for reflecting light from an optical transmission path on incident side and actuators (60) for actuating the mirror device (90), the mirror device (90) adapted for switching an optical path of the light incident from the optical transmission path on incident side into an optical transmission path on outgoing side by the actuation performed by the actuators (60), the method comprising manufacturing a piezoelectric element (65) of the actuators by directly producing a piezoelectric thin film on a substrate (see paragraph [0014]), wherein the substrate is a Silicon-on-Insulator substrate (see paragraph [0057])

With respect to claims 36 and 40, Hwang (figures 3 and 5) discloses the optical switch, wherein the actuators comprise a plurality of rows of piezoelectric elements (65, 265) having longitudinal directions arranged in parallel and wherein the plurality of optical transmission paths are arranged in correspondence to the plurality of rows of piezoelectric elements.



The prior art fails to disclose or reasonably suggest an optical switch, wherein the mirror device is held by torsion springs that are arranged so as to be orthogonal to the longitudinal directions, and wherein the mirror is thus inclined in a rotation direction

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such that the torsion springs serve as a rotation axis as recited in claim 21; wherein strain absorbers extending along the longitudinal directions are provided in part of the piezoelectric elements with respect to the longitudinal directions as recited in claims 22 and 26; wherein the actuators comprise at least a plurality of piezoelectric elements of which both ends are supported as fixed ends and of which the longitudinal directions are arranged in parallel as recited in claim 27; wherein the mirror device holding device is a device that holds the mirror device by electrostatic actuation independent of the actuation of the piezoelectric thin films or mechanically and wherein the application of the voltage to the piezoelectric thin films is canceled when the mirror device is held as recited in claims 29 and 39 and wherein low-flexural-rigidity parts that flex with a reverse curvature with respect to a flexure curvature of the piezoelectric elements are configured as recited in claim 37.

12. Claim 30 is allowed.

The prior art also fails to disclose or reasonably suggest a method of manufacturing an optical switch comprising a mirror device for reflecting light from an optical transmission path on incident side and actuators for actuating the mirror device, the method comprising manufacturing a piezoelectric element of the actuators by transferring a piezoelectric thin film formed on a substrate onto another substrate.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lee et al. (U.S. Patent 6,360,033) and Mao et al. (U.S. Patent 6,865,313) disclose an optical switch.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Doan whose telephone number is (571) 272-2346. The examiner can normally be reached on Monday to Thursday from 6:00 am to 3:30 pm, second Friday off.

15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**JENNIFER DOAN
PRIMARY EXAMINER**

JD

January 19, 2006